UTILIZING CONCEPT MAP IN IMPROVING THE STUDENTS' UNDERSTANDING OF DATA ANALYSIS IN PRACTICAL RESEARCH 1
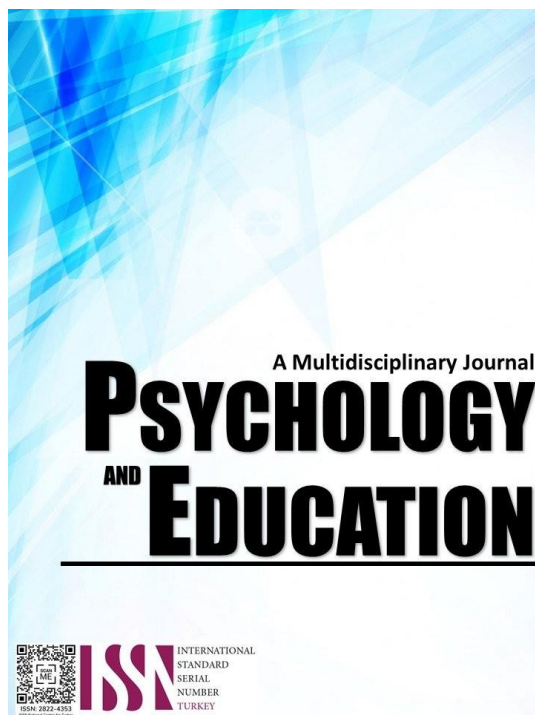
Utilizing Concept Map in Improving the Students' Understanding of Data Analysis in Practical Research 1

Janine P. Rulona*
For affiliations and correspondence, see the last page.

Abstract

Understanding the process of qualitative research is a problematic issue experienced by senior high school students. This action research aimed to aid the issue by utilizing concept map as instructional tool to improve the understanding of students specifically in Data Analysis as a lesson in Practical Research 1. This study was conducted in a private school. There were 35 students as population of the study. Furthermore, this study utilized a qualitative approach. Data was collected through observation and in-depth interviews. The study began with identifying a learning competency in the K-12 curriculum which the students find very difficult during the second semester in Grade 11. Moreover, a lesson was designed, utilizing concept map as instructional tool for the activity. 7 students were included in the post interview. As a result, it was found out that the concept map is an effective instructional tool to improve the understanding of Data Analysis as lesson in Practical Research 1. The effects of concept map on their understanding were organized ideas, easier understanding, and improved understanding. Majority of the students also agreed that concept mapping is an effective instructional tool to improve the understanding of Data Analysis as a lesson in Practical Research 1. Lastly, an action plan is proposed for future use.

Keywords: *concept map, data analysis, qualitative classroom action research*

Introduction

I am a Grade 11 teacher handling Practical Research 1. I have observed that the students have a hard time understanding Data Analysis. I want to test their skills in analyzing the data after doing a simple individual interview. I presume that by doing this, they will be able to infer and explain patterns and themes from data with a code: CS_RS11-IVd-f-2 (SHS Curriculum Guide for Practical Research 1, 2013).

Writing research is one of the most difficult projects of a senior high school student (Peñeda & Caidoy, 2023). There are many factors that make writing qualitative research paper a difficult task such as protocols in writing qualitative research, understanding qualitative research paradigm, especially the concepts and of validity and subjectivity, understanding the systematic way of data analysis, becoming familiar with genre knowledge and presenting findings, and expanding their knowledge (Wang, 2013).

In addition, a study by Ecija and Siguan (2021) revealed three most challenging problems experienced by senior high school in writing research: human resource; time; and, money. The latter is found out to be the most challenging item for them (2020). Teachers can relate to how students react to research. In fact, a study of Bullo et al., teachers see research as additional burden and workload. Majority of the challenges of teachers in teaching and writing research as mentioned in the study were lack of time, writing anxiety, lack of support and resources, and inadequate knowledge in research.

Moreover, as a research teacher, I can relate to the experiences mentioned in previous related literature. Although there are pieces of literature that study about challenges of students and teachers both in writing and teaching research and analyzing qualitative data (Wang, 2013; Bostrom, 2019; Raddon et al., 2009; Ecija & Siguan, 2020; Bullo et al., 2021; Caidoy, 2023), there is a dearth of research studies that delve into how qualitative data analysis is best taught by teachers and learned by students. Therefore, the purpose of this study is to address the common problem experienced in senior high school.

Research Questions

This study aims to find out whether concept mapping is an effective tool to infer and explain patterns and themes in data analysis. Specifically, it sought to answer the following research questions:

1. What are the participants' experiences in analyzing subjective data in qualitative research?
2. What are the effects of concept mapping on improving the participants' understanding of data analysis?
3. Is concept mapping an effective tool to infer and explain patterns and themes in data analysis?

Literature Review

Research Writing

In both the academic and professional areas research writing is an essential talent vital to spreading and developing information. This study integrates knowledge from multiple academic sources to explore the key components, typical problems, practical solutions, and best practices in research writing (Castillo, et al., 2021). Research writing is one of the most difficult tasks to complete in senior high school (Peñeda & Caidoy, 2023). However, this activity must be learned by the students in senior high school and they are expected to

understand the process of research writing.

It might be difficult to write with coherence and clarity, especially when dealing with complex subjects. It is important for writers to aim for a logical flow and precise idea articulation (Swales & Feak, 2012). Qualitative data analysis is a complex and iterative process that requires careful consideration of methodology and techniques (Linneberg & Korsgaard, 2019). Flick (2022) argued that qualitative research entails a consistent reliance on literature derived from the assumptions of participants, not allowing for researchers' personal perspectives.

Research writing recognizes that different research questions may require different approaches, allowing researchers to adapt their methods to achieve meaningful and useful results (Thanyawatpornkul, 2024). Pragmatism ultimately empowers researchers to select the most appropriate methodological approach to meet their research goals. Bazeley denotes that as a researcher faces his own research problem, he can learn from others' experiences and the methodologies they have developed, but ultimately, the researcher will make his own decisions about how best to solve your research problem (2013).

Qualitative Data Analysis

The goal of qualitative research is to comprehend how individuals see the world. Although there are numerous methods for conducting qualitative research, most of them are adaptable and concentrate on maintaining nuanced interpretations of the findings (Andriani & Apriliyana, 2021). Furthermore, grounded theory, ethnography, action research, phenomenological research, and narrative research are examples of common methodologies. While they highlight distinct goals and viewpoints, they do have certain commonalities.

An essential tool for learning in-depth details about social phenomena and human behavior is qualitative data analysis. It calls for a methodical interpretation of intricate, non-numerical data in order to produce insights that are relevant. By utilizing techniques such as narrative analysis, grounded theory, and thematic analysis, researchers can reveal themes and patterns that offer a more profound comprehension of the research topic (Sutton & Austin, 2015).

Maintaining a reflective journal can be done in any way, right or bad (Delvetool, 2022). In addition to preventing bias, keeping a log of your work allows you to keep track of it and include it into your write-up. You can see that there is a great deal of variation in the approaches if you look at publications written by different researchers.

Methodology

Research Design

This study utilized qualitative classroom action research design. Action research is a qualitative method that focuses on solving problems in social systems, such as schools and other organizations. The emphasis is on solving the presenting problem by generating knowledge and taking action within the social system in which the problem is located (Applied Doctoral Center, 2023).

Participants

This study was conducted among the Grade 11 students who are under the class of Practical Research 1. Practical Research 1 is an applied subject offered in Senior High School under the K-12 program of Department of Education that focuses on Introduction to Qualitative Research. 7 students were invited for individual interview. According to Subedi, 1-20 participants are appropriate for qualitative research regardless of the designs (2021).

Instruments

This study used an interview guide for the individual in-depth interview as the study's instrument for qualitative research. The interviewer was very careful to be neutral before starting the interview to avoid leading the respondent, hence minimizing bias. With the use of individual interviews, the researcher was able to understand the ideas of the respondents, and they were also able to secure the privacy of the interview. Researchers also considered the context of the interviewer and the respondent (Oltmann, 2016).

Furthermore, the in-depth interview can give the researchers an understanding of the respondents' experiences and insight into their perceptions of the study (Coughlan et al., 2013). During the interview, the researchers will use recording devices such as video recorders, voice recordings, and other devices that can help them ensure the success of data gathering. In addition, after the in-depth interview, there will be a focus group discussion, a technique for qualitative data collection in which the researchers guide a chosen group of people in a thorough and meaningful discussion. Through interactions with various people, participants' attitudes, perceptions, knowledge, experiences, and practices are solicited through this method (Angehrn & Eeuwijk, 2017).

Procedure

I began to observe the students' reactions about the topic in second semester under Practical Research 1. My observations depicted the difficulty of students on what to do next after the conduct of data gathering procedure. A lesson plan was carefully designed to address the difficulty in data analysis. Presumably, students were the main focus of the intervention plan. The competency was unpacked from the SHS Curriculum Guide for Practical Research 1 for the fourth quarter of the school-year 2023-2024 wherein at the end of the lesson, the students must be able to infer and explain patterns and themes from data with a code: CS_RS11-IVd-f-2 (SHS Curriculum Guide

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for Practical Research 1, 2013)

Firstly, this plan was presented to the students. The students were randomly asked what are their experiences and perceptions upon hearing data analysis. Although, I observed them showed confusion, I can sense that students are excited about the lesson.

Conduct the In-depth Interview. Permission and endorsement letters will be addressed to the private school principal. Once the requests are approved, the survey and interview will be conducted.

Analysis of data. The researchers will utilize all gathered qualitative data. The data from the in-depth interview and focus group discussion will be collected, tallied, transcribed, and coded for interpretation. This study used Colaizzi's method (Kr, 2022), which is a widely used analytical approach in phenomenological research. Colaizzi's method was developed by Amedeo Giorgi and later refined by Paul Colaizzi to provide a systematic way of analyzing phenomenological data, particularly from interviews. The aim is to uncover the essence of the experiences being studied. Thematic analysis was employed to identify patterns and themes related to improvement of understanding Data Analysis in a Practical Research class.

Results and Discussion

This section presents the outcome of the qualitative analysis of the research questions answers. The results are presented based on the emergent themes, sub-themes, core ideas, and categorization.

This study aimed to address the difficulty of Grade 11 students in improving their understanding of Data Analysis as one of the lessons in Practical Research 1. 7 random students were selected to participate in the in-depth interview.

For Research Question # 1: "What are your experiences in analyzing subjective data in qualitative research before the conduct of the lesson?", there is one major theme that emerged.

Theme 1: No Understanding of Qualitative Data Analysis

Before the conduct of the lesson, the researcher made some observations of the students' reactions when asked, "What are your experiences in analyzing subjective data in qualitative research?" Students were confused and perplexed. The participants of the study answered vertically with the observation of the researcher.

"At first, Ahhh, I mean… at the beginning rather, I could not understand a little bit about the topic data analysis." [P1]

"oh, Ok! Haha! (shy laugh) I did not understand how to analyze subjective data in qualitative research." [P2]

"I was not able to, to, ahh, to you know… understand completely.. yes.. I mean, how to analyze subjective data in qualitative research. My experience was 'I was afraid to perform it because I know I will not do it correctly, hehe (smiles)." [P7]

Some students also said that they had other understanding about what data analysis is.

"I just thought, I don't know, abi man gud nako (in English: I thought).. that analyzing data is only about questioning and understanding." [P4]

"I thought a researcher will just gather data through recording, tapos mag video-video ra (in English: take videos only) the interview and transcribe it. But, I discovered data collection does not end there. There is more to learn. As in daghan pa gyud (in English: As in there is more really." [P6]

Understanding qualitative data analysis can indeed be challenging for students at first, but Braun (2012) suggested that breaking it down into simpler steps can help demystify the process. It requires careful attention to detail, critical thinking, and openness to unexpected insights or interpretations.

For Research Question No. 2, students were asked, "What are the effects of concept mapping in improving your understanding of data analysis?" Students have the same view about the use of concept mapping in their improved understanding of data analysis in Practical Research 1. Three themes emerged during the interview.

Theme 1: Organized ideas

Most of the students being interviewed spoke that concept mapping helped them organized their ideas in improving their understanding about data analysis.

"Well, Char! (expression)… Because of concept mapping, I now know how to organize the ideas about qualitative data analysis." [P2]

"Hala oi, daghan kog natun-an (in English: Oh, I learned much) Concept mapping helps me organize and comprehend the topic very well. [P5]

Theme 2. Easier understanding

Students shared the same views that concept mapping made their understanding easier about data analysis in Practical Research 1.

"The concept mapping we did as group, it helps me understand more and it added more knowledge about the data analysis even our output has only few information." [P1]

"Because of concept mapping... kanang... kuan... it is easier for me to understand the meaning of words and I also gained improvement on how to come up with themes." [P4]

"Sayon raman diay, hahaha! (in English: It is easy) It made the learning easier. I have understood the topic more. A concept map improves my understanding." [P6]

"Seriously, concept map helped me understand how data analysis is being done. I still have a lot to learn, but at least the terminologies and its functions were clear to me. In the future, I know I can conduct data analysis on my own." [P7]

Theme 3. Improved Understanding

Over all, the students agreed that there is improved understanding when concept mapping is used as tool for understanding data analysis in Practical Research 1.

"The effect of concept map to me about data analysis is 'I was able to improve my understanding in a positive way." [P3]

"Sayon raman diay, hahaha! (in English: It is easy) It made the learning easier. I have understood the topic more. A concept map improves my understanding." [P6]

"The concept mapping we did as group, it helps me understand more and it added more knowledge about the data analysis even our output has only few information." [P1]

"Concept mapping helps me organize and comprehend the topic very well." [P5]

There is validity that lessons can be understood well when there is a correct strategy or pedagogical practices. Richards et al. highlight the importance of reflexivity in qualitative research, encouraging students to reflect on their own biases, assumptions, and positionality. Discuss how researchers' backgrounds and perspectives can influence data collection, analysis, and interpretation (2024).

Morover, Heppen and Seidenfeld argued that hands-on practice offers opportunities for students to conduct their own mini qualitative research projects. This could involve designing interview questions, conducting interviews, transcribing data, and analyzing findings. Practical experience enhances comprehension and retention of qualitative research methods (2024).

For Research Question No. 3, students were asked, "Is concept mapping an effective tool to infer and explain patterns and themes in data analysis?" There is only one major theme that emerged from the students' responses during the interview.

Theme 1. Effective

The results of this study showed that the increased understanding of the students about data analysis in Practical Research 1 is brought by concept mapping. For instance, P1, P2, P3, P4, P6 and P7, have shared their views.

"Yes, it is an effective tool Miss, for us students because it helps us add more information about patterns and themes in data analysis." [P1]

"Yes. For me, concept mapping is a very effective tool to infer and explain patterns and themes in data analysis." [P2]

"Yes. It helps especially the students to become more effective in understanding data analysis and come up with themes." [P3]

"Yes, because I was able to understand how themes are carried out." [P4]

"Yes. To me, it is a creative tool that lets students understand the context of broad ideas written in long paragraphs. With a concept map, learning is made easy." [P6]

"I recommend using concept map as learning tool to explain processes because it is effective." [P7]

Agreeably, scholars and researchers agree that students are engaged in classroom discussions when teachers use significant learning materials. Fontes and Piercy recommend that there is a need for teachers to design experiential learning activities that immerse students in the qualitative research process. For example, role-playing scenarios where students take on the role of researchers conducting interviews or focus groups can provide valuable insights into the challenges and dynamics of qualitative data collection (2000).

Reflection

In the conduct of this study, I realized that simple teaching strategies when utilized very well in a classroom setting will surely aid the students hunger for learning. As a language teacher, it is not enough to just be a proficient teacher in the classroom. Language teachers are not just basically English teachers alone but also expected to teach other English-related subjects like Practical Research. Since according to previous studies, research is one of the most difficult subjects in senior high school, it is imperative for teachers to engage also in interactive classroom activities.

Concept mapping is seen as a very simple instructional tool. However, when used as an activity tool in the implementation, I realized that it made good improvement to my students' understanding. They were able to infer and explain the features and the process of Data Analysis.

Action Plan

In the conduct of this study, the researcher proposes for an action plan to better understand data analysis in Practical Research 1.

Objectives	Strategies	Time Frame	Resources	Expected Outcome	Clientele
Ensure that the students have the learning resources	The teacher should make use of students' available learning resources	January of the school year / beginning of the second semester	Library	Timely distribution of learning resources	Students
Determine the students' lowest competency	Preparation	1st week of March	K-12 Curriculum Guide from DepEd	Data	Students
Ask students what do they understand about "data analysis"	Interview selected students (very active, moderate, not active students)	1st week of March	Teacher	Data	Students
Design a Lesson Plan	Preparation	2nd week of March	Curriculum Map	Lesson Plan	Students
Prepare the instructional materials	Preparation	2nd week of March	Schools funds	Learning materials / instructional materials	Students
Implement the lesson	Interactive classroom discussion and implementation	3rd week of March	Teacher	Increased understanding about data analysis	Students

Figure 1. *Action Plan*

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Affiliations and Corresponding Information

Janine P. Rulona, LPT, MAED
Maryknoll School of Sigaboy, Inc. – Philippines